REMARKS/ARGUMENTS

Claims 1-14 were previously pending in the application. Claims 1-14 are canceled; and new claims 15-26 are added herein. Assuming the entry of this amendment, claims 15-26 are now pending in the application. Support for new claims 15-26 is found in Figs. 1 and 2 and in the corresponding sections of the specification. The Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

Oath/Declaration

On page 2 of the office action, the Examiner required a statement over applicant's signature providing a complete post office address. In response, the Applicant submits herewith a substitute Declaration and Power of Attorney providing the requested information.

Drawings

On page 2, the Examiner also objected to the drawings as failing to comply with 37 CFR 1.84(p)(4) and 1.84(p)(5).

Regarding 37 CFR 1.84(p)(4), the Applicant has amended the specification to avoid reference character "101."

Regarding 37 CFR 1.84(p)(5), the Applicant submits herewith a Transmittal of Corrected Drawing(s) amending Fig. 1 as suggested by the Examiner.

Claim Rejections

On page 3, the Examiner rejected claims 1, 3, 5-6, 10, and 12 under 35 U.S.C. 102(b) as being anticipated by Soltz. On page 5, the Examiner rejected claims 1-6, 10, 12, and 14 under 35 U.S.C. 103(a) as being unpatentable over Soltz in view of Robinson. On page 6, the Examiner rejected claims 7-9 under 35 U.S.C. 103(a) as being unpatentable over Soltz in view of Yang. On page 7, the Examiner rejected claim 10 under 35 U.S.C. 103(a) as being unpatentable over Soltz in view of Josse. On page 8, the Examiner rejected claim 11 under 35 U.S.C. 103(a) as being unpatentable over Soltz in view of *In re Karlson*. On page 8, the Examiner also rejected claim 13 under 35 U.S.C. 103(a) as being unpatentable over Soltz in view of Titus. For the following reasons, the Applicant submits that all of the now-pending claims are allowable over the cited references.

New claim 15 is directed to a fuse apparatus for igniting an explosive charge of an ordnance, where the fuse apparatus comprises a laser, an electrically controlled mechanical switch, and a control unit. The laser generates a laser optical signal for igniting the explosive charge. The mechanical switch comprises a base, an actuator connected to the base, and an actively controlled movable element that moves relative to the base as a function of an electrical control signal applied to the actuator. The mechanical switch can be configured in (1) a first switch configuration in which at least one of position and orientation of the movable element is controlled by the actuator to directly prevent the laser optical signal from impinging on the explosive charge and (2) a second switch configuration in which at least one of the position and the orientation of the movable element is controlled by the actuator to directly enable the laser optical signal to impinge on the explosive charge. The control unit generates and transmits the electrical control signal to the actuator to change the configuration of the mechanical switch from the first switch configuration to the second switch configuration. The cited references do not teach such a combination of features.

Soltz also teaches a fuse apparatus for igniting an explosive charge of an ordnance. Like the present invention, Soltz teaches a laser (16) that generates a laser optical signal for igniting an explosive charge (22). Soltz also teaches a device (66) for selectively enabling and disabling the laser optical signal from reaching the explosive charge as controlled by a control unit (14). Significantly, however, in Soltz, that enabling/disabling device is a piezoelectrical crystal, which is not an electrically controlled mechanical switch as recited in new claim 15. In particular, Soltz's piezoelectrical crystal does not have a base, an actuator connected to the base, and an actively controlled movable element that moves relative to the base as a function of an electrical control signal applied to the actuator, as explicitly recited in new claim 15. Nor can Soltz's piezoelectrical crystal be configured in (1) a first switch configuration in which at least one of position and orientation of a movable element is controlled by an actuator to directly prevent the laser optical signal from impinging on the explosive charge and (2) a second switch configuration in which at least one of the position and the orientation of a movable element is controlled by an actuator to directly enable the laser optical signal to impinge on the explosive charge.

Robinson teaches a "release and latch anchor assembly" for "MEMS-type devices, particularly devices whose moving elements react in response to predetermined inertial loading inputs externally imposed thereupon." See Abstract. These devices are nothing more than accelerometers that passively react to acceleration of the device to generate a signal indicative of that acceleration. In particular, the devices have different passive elements that move with respect to one another when the device accelerates at a sufficiently high level. This relative motion of one passive element with respect to another passive element "mechanically closes or opens an output actuated device such as a valve, electrical contacts or optical transmitting device" that provides a signal indicating that the device has been subjected to such a sufficiently high level of acceleration. See Abstract.

Figs. 9A-B and 10A-C show examples of Robinson's accelerometers in which the "output actuated device" involves an optical signal. As explained in column 8, lines 22-32, in the example of Figs. 9A-B, when the accelerometer is subjected to a sufficiently high level of acceleration, slider 82 (i.e., the device's movable element) passively moves, relative to land structure 10, from its position in Fig. 9A to its position in 9B, during which motion slider 82 pushes mechanical output pin 25 to deflect optical fiber 83 from its configuration in Fig. 9A to its configuration in Fig. 9B, such that light from the deflected fiber of Fig. 9B reaches optical sensor 84, which generates an electrical signal indicating the occurrence of that acceleration.

Figs. 10A-B show another example of Robinson's accelerometers. As explained in column 8, lines 33-41, in this alternative embodiment, light from light source 78 reaches optical sensor 84 in Fig. 10A to indicate that the device has not yet been accelerated, but, after the device has been subjected to acceleration, as shown in Fig. 10B, output pin 25 blocks the light from reaching optical sensor 84, thereby providing a signal indicative of the acceleration (in this case, the absence of a signal from optical sensor 84 indicates the occurrence of acceleration).

As explained in column 8, lines 41-56, in the embodiment of Fig. 10C, output pin 25 has a reflective angled surface 93 that re-directs the light to another optical sensor 86, thereby providing a single-throw, double-pole optical switch for the acceleration indication signal.

Significantly, there is absolutely no teaching or even suggestion in Robinson for the use of his optical signals to directly ignite any explosive charges. They are merely used to indicate whether the device has been subjected to a sufficiently high level of acceleration.

Moreover, the elements in Robinson's accelerometers that directly affect the optical signal (i.e., either by blocking or re-directing the light to and/or from optical sensors) are purely passive elements

that move as a result of "inertial loading externally imposed thereupon." This is very different from the mechanical switch of the present invention, which is an active device having an controlled actuator that causes the actively controlled movable element to move relative to the base.

Note that Robinson does teach a controlled actuator that causes a movable element to move relative to other elements in his accelerometers. See, e.g., Fig. 14 and column 14, lines 43-45. Significantly, however, the purpose of this actuator is to move linchpin 7 from the position shown in Figs. 1A, 2A, 4C, 5A, and 14, in which the accelerator is disabled (i.e., slider 24 is locked relative to land structure 10), to the position shown in Figs. 1B and 5B, in which the accelerator is enabled but not yet "tripped" (i.e., slider 24 is unlocked but still in its original position relative to land structure 10). Once linchpin 7 has been removed, for example, using a controlled actuator, the accelerometer is able to passively react to externally applied inertial loading.

To summarize, Soltz teaches a fuse apparatus having an actively controlled element that selectively enables laser light from impinging on and thereby igniting an explosive charge of an ordnance, but that actively controlled element is a piezoelectrical crystal; it is <u>not</u> an electrically controlled mechanical switch having a base, an actuator, and a movable element.

Robinson teaches accelerometers having different movable elements, for example, linchpin 7, slider 24, and output pin 25. Robinson teaches embodiments in which linchpin 7 is actively controlled, but the movement of linchpin 7 does not directly prevent or enable the propagation of any optical signal. Slider 24 and output pin 25 do move to directly affect the propagation of an optical signal, but those elements are not actively controlled. Moreover, there is no teaching or even suggestion for using Robinson's optical signal to ignite any explosive charge.

Thus, even if Soltz and Robinson were interpreted as teaching all of the <u>individual</u> elements that are part of the present invention (which the Applicant does not necessarily admit), the Applicant submits that those references do <u>not</u> teach or even suggest the <u>particular</u> way in which those individual elements are configured to form the present invention recited in claim 15.

Furthermore, modification of the teachings in Robinson to provide the features missing in Soltz would destroy the functionality of Robinson's accelerometers. By its very nature, in order to function properly, an accelerometer must be free to react to externally applied inertial loading (as Robinson's accelerometers are free to do after linchpin 7 has been removed). To meet the present invention, the design of the devices shown in Robinson's Figs. 9 and 10 would need to be modified to provide active control, as compared to their disclosed passive nature, which design modification could very well interfere with the ability of the device to appropriately respond to externally applied inertial loading, thereby destroying the device's ability to function as an accelerometer. If a prior art reference is cited that requires some modification in order to meet the claimed invention or requires some modification in order to be properly combined with another reference and such a modification destroys the purpose or function of the invention disclosed in the reference, then a person of ordinary skill in the art would not have found a reason to make the claimed modification. See, e.g., <u>In re Gordon</u>, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). As such, the Applicant submits that this provides additional reasons why it would be improper to combine the teachings in Soltz and Robinson to reject the present invention.

The other references of record do not provide the teachings missing from Soltz and Robinson.

For all these reasons, the Applicant submits that claim 15 is allowable over the cited references. Since the rest of the claims depend variously from claim 15, it is further submitted that those claims are

also allowable over the cited references. The Applicant submits therefore that the rejections of claims under Sections 102(b) and 103(a) have been overcome.

In view of the above amendments and remarks, the Applicant believes that the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Respectfully submitted,

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